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ABSTRACT

A study investigated the finding that metacognitive ability and reading level are related, and examined the effects of both presentation and response modes on young children's ability to detect ambiguity in messages. An ambiguity detection test was completed by 74 first grade children (who also completed a reading pretest), 26 second graders, and 20 third graders. Children were randomly assigned to oral or oral-plus-written presentation conditions, and point or verbal response conditions. Nine messages containing three levels of ambiguity were presented, and then the children were asked to choose the geometric shape described by the message. Unambiguous messages had only one correct referent, while partially ambiguous messages referred to two of the four shapes, and ambiguous messages referred to all four shapes. After indicating their responses, the children were asked if they had been told enough so that they could choose just the one shape that the experimenter had been thinking of, and were also asked to specify what further information they required to choose just one. Findings indicated a positive correlation between reading and performance on the ambiguity detection test. Message type, grade level, and response mode had significant effects on ambiguity detection, while mode of presentation did not. Of the first graders who responded correctly to all nine messages, all but four were able to specify what further information was necessary to choose correctly one of the four shapes presented. These findings provide further support for the link between metacognitive awareness and reading development. (A table of data and four references are included.) (NKA)

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PRESENTATION AND RESPONSE MODES IN YOUNG CHILDREN'S DETECTION OF AMBIGUITY

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ABSTRACT

This study sought to test the finding that metacognitive ability and reading level are related (Flood & Menyuk, 1983), and to examine the effects of both presentation and response modes on children's ability to detect ambiguity in communicative messages. Baker and Brown (1984) review the existing literature on comprehension monitoring and reading, and conclude that differences between good and poor readers are evident in the sophistication of the cognitive monitoring activities that they bring to reading tasks. Bonitatibus and Flavell (1985) argue convincingly for the utility of written messages in facilitating ambiguity detection. According to Robinson and Whittaker (1985), preventing a pointing response also affects children's ability to detect ambiguity. The experiment to be reported involved the presentation of nine oral or written ambiguous messages to 74 first grade children, 26 grade two children and 20 grade three children. The children were asked to choose the geometric shape (which varied on three dimensions) described by the message, by pointing or by verbally relating their choice. A brief reading pretest was presented to the first grade children, in order to assess their reading skill development. A positive correlation was found between reading and performance on the ambiguity detection task. Message type, grade level and response mode had significant effects on ambiguity detection, while mode of presentation did not. Of the first grade children who responded correctly to all nine messages, all but four were able to specify what further information was required in order to choose correctly one of the four shapes presented. These findings provide further support for the link between metacognitive awareness and reading development, and call into question the utility of written messages in facilitating comprehension monitoring for children at this stage of their development.

INTRODUCTION

As researchers continue to explore the cognitive development of young children, the emerging field of metacognition is rapidly gaining the attention of those investigators interested not only in how children think, but also in how they understand and control their own thought processes. Subsumed under the heading of metacognitive awareness are the many components of comprehension monitoring, such as the ability to skim or paraphrase a text, awareness of contextual violations or inconsistencies within a text, and the ability to detect ambiguity in messages. This latter skill, the detection of ambiguity, is the focus of the present research.

A rapidly growing body of evidence supports the existence of a link between metacognitive awareness and reading skill development. Clear differences between good and poor readers are often revealed in the metacognitive knowledge that they apply to a reading task (see Baker and Brown, 1984, for an excellent review of literature). Many of the cognitive activities brought to bear on a reading task are components of comprehension monitoring. In order to examine this intriguing relationship in the present population, a brief reading measure was developed and administered. This reading pretest introduced the subjects to the words used in the subsequent ambiguity detection task, thereby preparing them to make use of the presentation of written messages, and at the same time provided a measure of each child's reading skill development.

Various aspects of a message affect children's ability to evaluate its communicative adequacy. Bonitatibus and Flavell (1985) report that the presentation of written messages facilitates first grade children's ability to detect ambiguity, and argue that a written message prompts children to attend to and to evaluate the literal, rather than the intended meaning of the message. According to Robinson and Whittaker (1985), constraining children to respond verbally rather than by pointing also aids in detection of ambiguity, since a verbal response forces them to reexamine the message and the referents for alternative ways to describe their choice. Both mode of presentation and response were manipulated in the current study.

METHOD

The reading pretest was administered to 74 first grade subjects. Seven words used in the subsequent ambiguity detection task were presented first in contextualized print, and then in decontextualized print (see pretest posted). Scoring was based on amount of prompting necessary for the child to read the word correctly.

The stimuli and task used in the present investigation are based on Bonitatibus and Flavell's (1985) study. The children were presented with oral or oral-plus-written messages containing three levels of ambiguity, and were asked to respond verbally or by pointing. In order for children to verbalize their responses, the four quadrants of the stimulus arrays were numbered, as in the Test example.

The ambiguity detection task was given to the 74 first grade children, as well as to 26 grade two and 20 grade three children. The chidren were randomly assigned to oral or oral-plus-written presentation conditions, and point or verbal response conditions. Nine messages containing three levels of ambiguity were presented, and the children were asked to choose the geometric shape described by each message. Unambiguous messages had only one correct referent, while partially ambiguous messages referred to two of the four shapes, and ambiguous messages referred to all four shapes (see Test). After indicating their response, they were asked if they had been told enough so that they could choose just the one that the experimenter had been thinking of, and were asked to specify what further information they required to choose just one.

RESULTS

Message type had a significant effect on ambiguity detection, $F = 11.83$, $p < .0001$. No difference was found between responses to partially ambiguous and ambiguous messages, but correct responses occurred significantly more frequently to unambiguous messages than to both types of ambiguous messages, $F = 46.562$, $p < .01$. Table 1 gives mean performance of the experimental groups. First grade chidren obtained lower scores on the ambiguity detection task than both the grade two subjects ($F = 10.24$, $p < .01$) and the

grade three subjects ($F = 7.15$, $p < .05$), although no difference was found between the two older groups. Children in the point response condition responded correctly significantly more often than those in the verbal response condition ($F = 4.39$, $p < .04$). Presentation type did not affect ambiguity detection, that is, no difference was found between oral and oral-plus-written presentation of messages.

A Pearson product-moment correlation revealed a highly significant positive correlation between the first grade children's reading pretest scores (based on the first reading of the contextualized words only) and their total scores on the ambiguity detection task, $r = .33$, $p < .004$. Thus, as scores on the reading pretest increased, so did scores on the ambiguity detection task. Approximately one third of the first grade children ($N = 28$) correctly detected ambiguity in all nine messages. Within this group, all but four children ($N = 24$) were able to resolve the ambiguity in the messages by specifying what further information was required in order to choose correctly only one of the four shapes presented.

DISCUSSION

Our data provide further support for a relationship between metacognitive awareness and reading skill development, as measured by the ambiguity detection task and reading pretest. As reported in numerous other studies, better readers correctly detected ambiguity more frequently than poorer readers, and thus appear to engage in more efficient cognitive monitoring activities. The data from the first grade children indicate that the ambiguity-detecting children not only are aware of the communicative inadequacy of the messages, but also have specific strategies in place for resolving the ambiguity they encounter. However, one cannot impute a causal relationship to these data, since it is not yet clear whether metacognitive development precedes reading development, or is simply a product of it.

The finding that children experienced more difficulty responding correctly to partially ambiguous and ambiguous messages than to unambiguous messages suggests that the insufficiency of information provided by a partially ambiguous

or an ambiguous message demands a very different type of cognitive processing strategy than a communicatively adequate message. Not surprisingly, the older children performed better on the ambiguity detection task than the first grade children. However, the expected ceiling effect did not occur. Although the older subjects appeared to apply different problem-solving strategies in their efforts to detect ambiguity, their scores did not reflect the possible sophistication of their solution attempts. Older subjects seemed to be aware of the ambiguity in the messages, but the strategies they employed to resolve comprehension failures did not always produce correct responses.

The point response, rather than the verbal response, proved to facilitate the detection of ambiguity in this study. Numbering the quadrants may not have prompted the children to reexamine the referents and message in order to generate an unambiguous description of their choice, and in fact appeared to impose an additional task requirement.

Since written messages did not facilitate the detection of ambiguity in the present study, one might hypothesize that children's dependence on written cues as aids in comprehension monitoring occurs later in their development. An alternative explanation may be that the first grade children disregarded the written cues because of their lack of confidence in their literary skills, while the older subjects ignored them due to the simplicity of the two-word messages. Since metacognitive abilities appear to be related to reading development, equipping children with techniques and strategies that allow them to monitor and enhance their reading comprehension may enhance reading skill development. Or conversely, intensive reading training may improve children's metacognitive awareness. The current findings indicate only that these two abilities develop together.

Although numerous studies have investigated the effect of various aspects of communicative messages on children's ability to detect ambiguity, important variables that have yet to be quantified are the number and type of target and distractor items presented. Studies are in progress which examine and scale the effect of attentional factors on children's awareness of ambiguity.

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Table 1

Mean Number of Correct Responses

	Grade			
Message Type	One	Two	Three	Total
Unambiguous	2.68	2.92	2.95	2.78
Partially Ambiguous	1.73	2.42	2.10	2.01
Ambiguous	1.99	2.73	2.50	2.23
Total	2.13	2.69	2.65	

Note. Maximum score = 3.